

# SparkLab

SCIENCENTRE

## AT QUEENSLAND MUSEUM

### Australian Curriculum Links for Years 7 - 8

Term 3, 2020

*SparkLab* is a Sciencentre experience at Queensland Museum. Refer to the [Exhibition Guide](#) for an overview of the interactive exhibits and programs.

*SparkLab* exhibits and programs link to the Australian National Curriculum specifically in the learning areas of Science, Technologies and Mathematics, and support students to develop their general capabilities in Literacy, Numeracy, and Critical and Creative Thinking.

### General capabilities relevant to SparkLab

#### Direct links

#### Literacy

Comprehending texts through listening, reading and viewing.

Text, word and visual knowledge.

#### Numeracy

Recognise and using patterns and relationships.

Using spatial reasoning.

Using measurement.

#### Critical and Creative Thinking

Inquiring – identifying, exploring and organising information and ideas.

Generating ideas, possibilities and actions.

Reflecting on thinking and processes.

Analysing, synthesising and evaluating reasoning and procedures.

## Science

	Knowledge and Understanding	Science as a Human Endeavour and Science Inquiry Skills	Sample of linked <i>SparkLab</i> exhibits and programs
Year 7	Physical sciences (ACSSU117) Change to an object's motion is caused by unbalanced forces acting on the object.	<p>Questioning and predicting (AC SIS124) Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge.</p> <p>Planning and conducting (AC SIS126) In fair tests, measure and control variables.</p> <p>Processing and analysing information (AC SIS130) Summarise data and use scientific understandings to identify relationships and draw conclusions.</p> <p>Evaluating (AC SIS131) Reflect on the method used to investigate a question or solve a problem and identify improvements to the method.</p> <p>Communicating (AC SIS133) Communicate ideas, findings and solutions to problems using scientific language.</p>	<p><b>Rotation station:</b> Students spin in a chair and explore how moving their mass closer to the centre axis and changing their rotational inertia changes the speed of their rotation.</p> <p><b>Flight test:</b> Students design a flying machine out of paper and test their design in the vertical wind tunnel. How does your machine move in the air flow? Make a change to the design to see the impact of that change. How does a change in wind speed affect how the machine moves in the air?</p> <p><b>Air cannon:</b> Students lift a heavy bowling ball and let it fall from varying heights. The ball pushes the air in the large tube into a smaller tube, causing a light tennis ball to fly up high.</p> <p><b>Gravity run:</b> Students use a series of pipes, curves, wheels, hanging bells and balls to explore forces, motion and energy transfer and transformation. Students work together to problem solve building a successful ball run or extending the challenge to create a run that fits to a set criteria.</p> <p><b>Slow the fall:</b> Students drop discs made of varying materials and patterns between a track lined with magnets. Eddy currents within the discs generate a magnetic field. The interaction between the two magnetic fields will change how each disc falls.</p> <p><b>Science Bar: Under pressure</b> Students select and observe how different substances behave and change in a vacuum chamber – where the air pressure is decreased and increased. They</p>

			<p>consider forces when observing changes. This program is facilitated by a Learning Officer.</p> <p><b>Maker Space: Slow it down.</b> Design a cart that will slow down before it reaches the end of the track. What forces are acting on the cart as it moves along the track? What forces could you use in your design to change the way the cart moves? How far from the end can you make your cart stop</p>
	<p>Earth and space sciences (ACSSU116) Some of Earth's resources are renewable, but others are non-renewable.</p>		<p><b>Energy from the sun/wind circuits:</b> Students connect circuits to solar cells and wind turbines and use these alternative sources of energy to generate electricity and make a light glow or disc spin.</p> <p><b>Science on a Sphere:</b> Students can select a number of presentations on our 1.8m sphere, showing information collected from satellites or ground based instruments. Different presentations explore resources such as <u>water in dams and reservoirs</u>, and <u>Drought risk – real time</u>. Other presentations can lead to discussion around energy use, including <u>Air traffic around the Earth</u> and electricity produced <u>Night-time lights</u>.</p>
<p><b>Year 8</b></p>	<p>Chemical sciences (ACSSU151) The properties of the different states of matter can be explained in terms of motion and arrangement of particles.</p> <p>Chemical sciences (ACSSU225) Chemical change involves substances reacting to form new substances.</p>	<p>Questioning and predicting (AC SIS139) Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge.</p> <p>Planning and conducting (AC SIS141) In fair tests, measure and control variables.</p> <p>Processing and analysing information (AC SIS145) Summarise data and use scientific understandings to identify relationships and draw conclusions.</p>	<p><b>Touch the lightning:</b> Students interact with a large plasma ball and investigate the intensity of the plasma filaments and where and why they are attracted to certain positions on the glass globe.</p> <p><b>Air flow:</b> Students test two different vehicles in a wind tunnel (using mist trails) and experiment with varying the position of the vehicle and the wind speed. As well as thinking about effective design, they also explore turbulence and laminar flow.</p> <p><b>Science Bar: Mix Master:</b> Students predict and observe what happens when a variety of household products are mixed together. What are the clues</p>

		<p>Evaluating (AC SIS146) Reflect on the method used to investigate a question or solve a problem and identify improvements to the method.</p> <p>Communicating (AC SIS148) Communicate ideas, findings and solutions to problems using scientific language.</p>	<p>that that a chemical reaction has occurred? This program is facilitated by a Learning Officer, however the investigation is directed by the students.</p> <p><b>Science Bar: Will it float?</b> Students predict and observe what happens when various objects are placed in different liquids. Students explore density and suggest changes to solutions to alter the density and change the outcome. This program is facilitated by a Learning Officer, however the investigation is directed by the students.</p>
	<p>Physical sciences (AC SSU155) Energy appears in different forms including kinetic energy, heat and potential energy, and causes change within systems.</p>		<p><b>Circuits:</b> Students build circuits and explore the components of circuits along with electrical energy transforming into light energy (bulbs) or kinetic energy (hand dryer fans), and how light sensors can complete a circuit and trigger an alarm. Students also explore energy generated from solar cells and wind turbines</p> <p><b>Gravity run:</b> Students use a series of pipes, curves, wheels, hanging bells and balls to explore forces, and energy transfer and transformation. Students work together to problem solve building a variety of successful ball runs. Students can explore potential, kinetic and sound energy.</p>

## Technologies – Design and Technologies

	Knowledge and Understanding	Design and Technologies Processes and Production Skills	Sample of linked <i>SparkLab</i> exhibits and programs
<b>Year 7 - 8</b>	Analyse ways to produce designed solutions through selecting and combining characteristics and	Generate, develop, test and communicate design ideas, plans and processes for various audiences using appropriate technical terms. (ACTDEP036)*	<b>Maker Space:</b> Use everyday materials to design and build a solution to the Maker Space challenge – <b><i>Slow it down.</i></b> Through design thinking, create a

	properties of materials, components and equipment. (ACTDEK034)*	Independently develop criteria for success to evaluate design ideas. (ACTDEP038)	<p>cart that slows down and stops before it reaches the end of the track. Select appropriate materials by considering their properties and characteristics. What components will you need to create your cart design? Make a change to improve your design.</p> <p><b>Gravity run, Flight Test and Balance bridge:</b> Students problem solve to design a solution to the challenges posed at each of these exhibits. Through design thinking, students construct, test and improve on their designs.</p>
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\* Indirect link